Transitions in a globalising world

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Abstract

The increasing complexity of our global society means that sustainable development cannot be addressed from a single perspective or scientific discipline. By using the concept of transitions, we examine current and future tensions between welfare, well-being and the environment, and focus on four major issues that are of global importance: two of our key natural resources, water and biodiversity; the health of human populations; and the developments related to global tourism. In our global assessment we base ourselves on the most recent scenario efforts of the Intergovernmental Panel on Climate Change (IPCC). Future developments are explored along the lines of four development paths (scenario groups), defined along two dimensions (global versus regional dynamics and emphasising economic objectives versus environmental and equity objectives.

Keywords

Globalisation, transitions, sustainable development.

1. Introduction

During the last decades, human dynamics, institutional change, political relations and the global environment got more and more intertwined. This increasing integration at a global scale between economic vitality, new forms of governance, social development and environmental quality is often referred to as globalisation (e.g. [1, 2]).

There is little doubt that globalisation has produced significant gains at the global level. On a worldwide level, globalisation has facilitated the growth of foreign trade. Goods and services, capital, technology and labour all move more freely across borders. In addition to economic gains, there have been significant benefits in the areas of culture and governance [3]. Public awareness of issues such as human rights, democracy and gender equality has increased significantly as a result of greater access to newspapers, radio, television, telephones, computers and the Internet. This may lead to improved allocative efficiency for purposes of growth and human development [4].

At the same time, however, globalisation is also creating new threats: to individuals, societies and ecosystems. There are justified fears that it may be exacerbating the gap between rich and poor, and creating new threats to human security in terms of financial volatility, political and cultural insecurity and environmental degradation. In other words, the positive, innovative and dynamic aspects of globalisation are being tempered by forces that create disruption and marginalisation, such as population growth and migration, the emergence of infectious diseases, widening disparities in development world-wide, climate change, an accelerating loss of biodiversity, and the scarcity and pollution of freshwater resources. But the following question still remains: What is the overall impact of this globalisation process?

The complexity of the process of globalisation calls for a truly integrated approach, combining the economic, social-cultural, and ecological aspects [5]. We realise that there are many ways of describing the complexity of global dynamics encompassing processes like globalisation, none of which is perfect. In this paper we do not pretend at all to describe globalisation in a comprehensive manner. That goes far beyond the current capacity of our mental ability to capture the intricate dynamics of the global system: due to our ignorance and indeterminacy of the global system that may be out of reach for ever. However, what we can do is shed some light on the increasing complexity of our global system by providing some examples that could enhance our insight into the functioning of the complex global system.

Our angle of assessing the current and future global dynamics is that of using the concept of transitions [6]. We use this concept for examining current and future tensions between welfare, well-being and the environment, and will focus on four major issues that are of global importance: two of our key natural resources, water and biodiversity; the health of human populations; and the developments related to global tourism.

2. Transitions to sustainable development

Before we link the concept of transitions to sustainable development, let's take a closer look the latter. Sustainable development is a complex notion that is inherently normative and subjective, because it requires an estimation of *what* the needs of the present and future generations are and *how* they can be fulfilled; it is also an ambiguous notion, because it requires trade-offs between social-cultural, economic and ecological developments which can be weighed differently. However, this does not mean that sustainable development cannot be operationalised.

Following a pluralistic approach, the line of reasoning is the following: sustainable development comprises a certain balance among current and future social-cultural, economic and ecological developments. We depict this in Figure 1, building upon multiple capital models as developed by the World Bank and the Wuppertal Institute (e.g. [7, 8]). Social aspects are related to the social behaviour of the various 'actors' (individuals, institutes or communities). These are all closely linked to the concepts of human capital (i.e. people, with their health and skills) and social capital (i.e. institutions, cultural cohesion and collective knowledge). Economic aspects include production and consumption for economic sectors such as energy, agriculture, industry and services. Ecological aspects relate to the structure and functions of the ecosystem, such as physical, chemical and biological processes, climate change, and biodiversity-related issues.

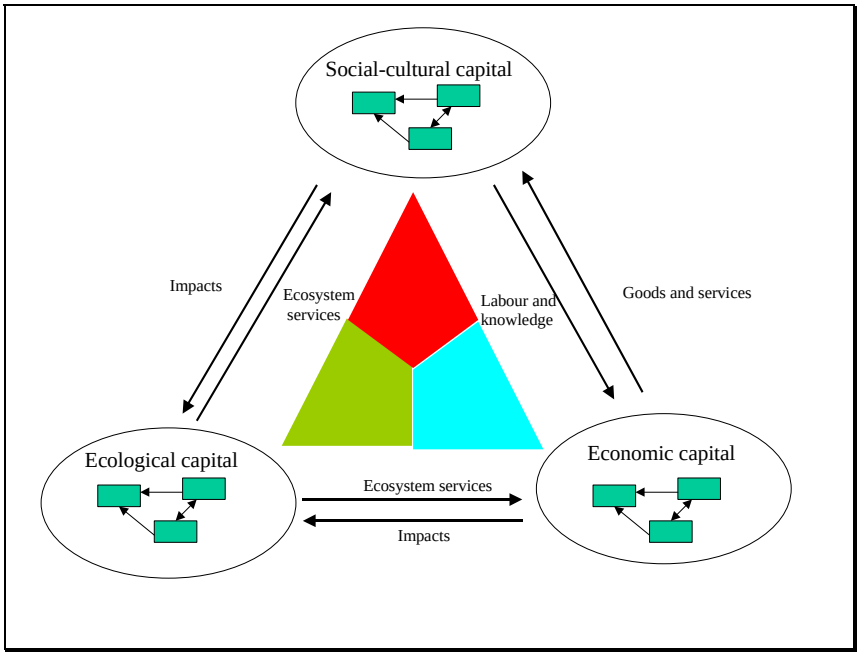

Figure 1: The triangular model (Source: [6]; see also [7]).

We use this triangular model to create a visual representation of the state of an environment at any given moment (see Figure 2). In this way, three different situations can be visualised: 1) depletion, whereby the total size of the capital decreases; 2) substitution, in which there is an exchange between the capital forms;

and 3) reinforcement, in which the size of the total capital increases. Every domain has its own dynamics. Cultures only change slowly, just like ecological systems. Economic changes, however, can take place suddenly and are usually determined by the lifespan of capital goods. Institutional and technological changes are somewhere in between. The tempo and direction of these dynamics are, therefore, ultimately constrained by the slowest processes.

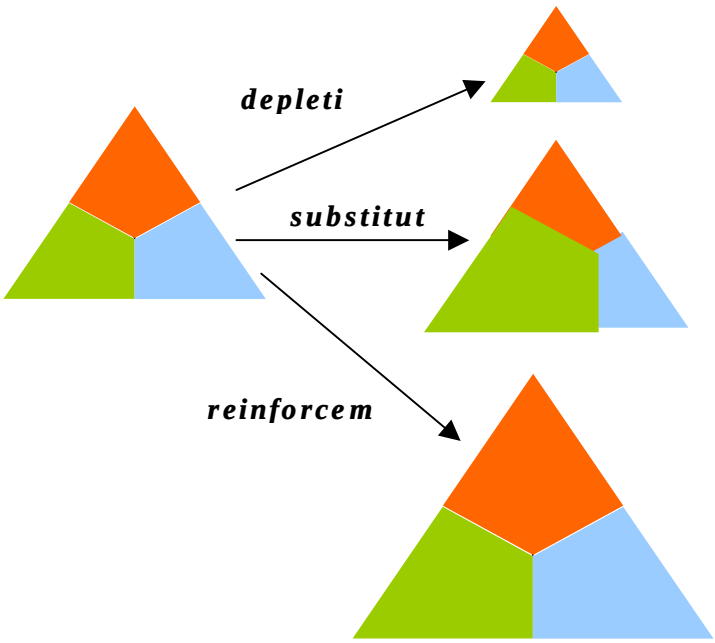

Figure 2: The dynamics of the relationships between the different kinds of capital.

3. Global dynamics: a family of transitions

What is the relationship between the transitional viewpoint (see Box 1) and sustainable development? To clarify this, we again go back to our pluralistic starting-point. Transitions only occur when developments, policies and initiatives from multiple actors in the three different domains reinforce each other at different scale levels.

Looking from a transitional perspective at current global dynamics (focussing on the key issues mentioned before), we recognise certain generic patterns which are different in different regions. In the first phase of the socio-economic-ecological transition, natural resources are used to ensure an adequate basic standard of living. The demand for food, energy, water, wood and raw materials increases in this phase and places a great deal of pressure on the ecological capital. Natural ecosystems are transformed through agriculture; there is a sharp increase in polluting emissions, as well as soil and water contamination, with subsequent consequences for biodiversity. In this phase, birth and death rates are still high. The availability of primary supplies of food, energy and water are of crucial importance here. The transition towards low birth and death rates can only be achieved when these primary supplies are available in sufficiently quantities. Other key factors are education and income levels. This

demographic shift is accompanied by a shift from contagious diseases to degenerative diseases (together constituting the health transition) [9]

In the next phase the economic transition involves a shift from an agriculture-based to an industrially oriented economy. The shift from agricultural to industrial activities, as well as the developments in infrastructure and growth in transport related to this, puts extra pressure on the ecological capital. This may lead to overexploitation of natural resources, such as over fishing, erosion of fertile land and soil contamination, often with disastrous consequences for biodiversity. The improved social conditions, hygiene and medical facilities lead to an overall improvement in human health, and in this stage of the health transition there is a considerable drop in birth rates.

In a later stage there is a shift from an industrially oriented economy to a services and information oriented economy. There is greater efficiency in the use of energy and materials, prosperity increases the volume of tourism, and the absolute pressure on the ecological capital at best stabilises. Further increases in social and material prosperity could be portrayed as a shift from merely 'living' to an 'enhanced quality of life'. Low birth and death rates - often at replacement level - together with an ageing population, are part of the demographic transition. The ecological transition marks the shift from expansion to intensification of agriculture. The indirect impacts of human-induced disruption of global biogeochemical cycles and global climate change start to become apparent. In particular, an increase in droughts, floods and storms may threaten society as well as seriously harm biodiversity.

The above pattern of interwoven transitions has unfolded in many developed countries all over the world. However, that is not to say that the intertwined social, economic and ecological transitions will take place in exactly the same way in developing countries. The characteristics of these transitions are heavily determined by regional political, institutional, social and cultural conditions.

Many developing regions are undergoing the health, economic and social transitions much more rapidly than was the case in the industrialised countries. The pace and scale of change has increased and geopolitical, macro-economic, technological, geographical and socio-cultural circumstances have changed. However, a number of poorer developing countries have yet to undergo the transitions needed simply to function in the modern global economy.

As mentioned before, it is important to be aware of the intertwined nature of the various transitions: they either diminish or stimulate each other. The whole picture, therefore, is one of a hybrid mixture of fast and slow dynamics. In Figure 3, this family of transitions (with tourism, health, water and biodiversity explicitly included) is visualised as a set of gears, influencing each other, with different circulation times. The gears can interlock with each other, in which case developments can be reinforced, but when they block each other, developments can be inhibited.

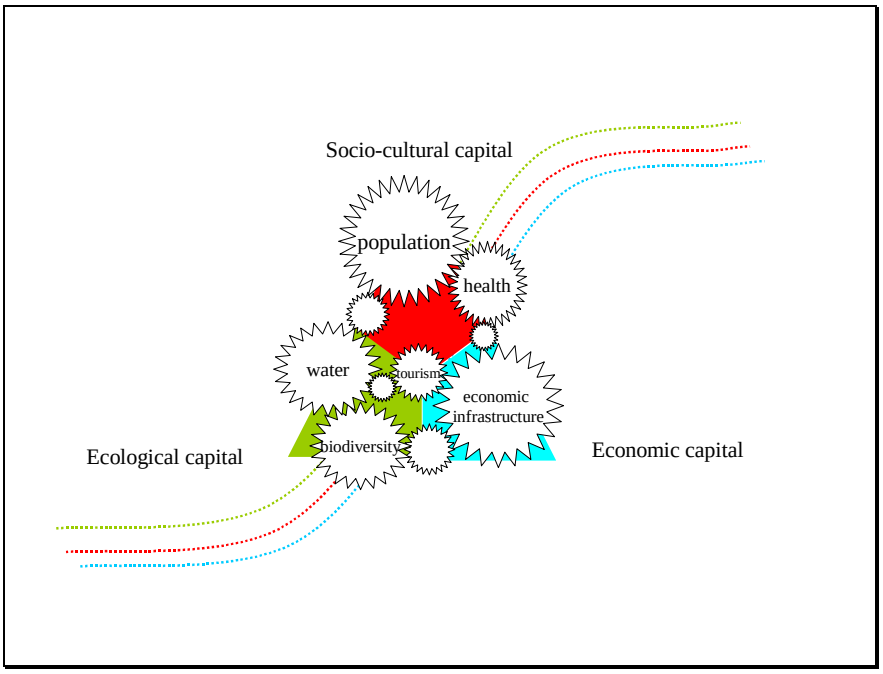

Figure 3: A transition is the result of developments in several domains: a 'family' of transitions.

4. Future prospects

In our global assessment (see for additional details [6]) we have chosen not to develop completely new scenarios, but to base ourselves on the most recent scenario efforts of the Intergovernmental Panel on Climate Change (IPCC) [10], developed over the past few years via a broad consultative process for estimating emissions of greenhouse gases over the coming century (see Box 2). This set of scenarios focuses on changes in economic, technological and demographic trends and energy use as major drivers for global climate change. Specifically, the scenarios explore the global and regional dynamics that may result from changes at a political, economic, demographic, technological and social level. The distinction between classes of scenario was broadly structured by defining them ex ante along two dimensions. The first dimension relates to the extent both of economic convergence and of social and cultural interactions across regions; the second has to do with the balance between economic objectives and environmental and equity objectives. This process therefore led to the creation of four scenario 'families' or 'clusters', each containing a number of specific scenarios.

The 1st family' of scenarios (A1 and B1) emphasise successful economic convergence and social and cultural interaction, while the 2nd (A2 and B2) focus on diverse regional developments. And whereas the 'A' storylines (A1 and A2) emphasise economic development and leave only a subsidiary role for environmental and social concerns, the 'B' storylines (B1 and B2) reverse these priorities.

We are very much aware of the drawbacks of the IPCC SRES scenarios. Their scope is rather narrow, focusing, as mentioned, on population growth, technological and

economic development as the major drivers for global change. They also consist of extrapolative and rather linear pathways to various futures, and contain no surprises or bifurcations. Further, the quantitative aspect is so dominant that it impairs the broad scope introduced by the underlying storylines.

Nevertheless we thought it would make sense to use the IPCC SRES scenarios, at least because their impact on present-day policy-making. For our global assessment, however, the four highly stylised sets of scenarios were too narrow: they needed to be embedded within a larger context of global trends, so we related them to key developments in water, biodiversity, health and tourism. Still, what's lacking is the larger social, cultural and institutional context, major additional policy interventions and major social, technological or natural disruptions or surprises. They are broad frameworks which allow us to think about the future under various social, economic and ecological conditions in a semi-structured manner. However, the high profile of the IPCC SRES scenarios makes it very valuable to explore and elucidate their broader implications. In the next section we therefore further extend the work of the IPCC.

Table 1: Issues linked with the IPCC SRES scenario families that illustrate the patterns of change (see [6] for additional details). (↗ favourable development; ↘ unfavourable development; → moderate or no change, ↕ mixed).

SRES scenario family	Water	Biodiversity	Health	Tourism*
A1	↕	↘	↗	↕
A2	↘	↘	↘	↘
B1	↗	↗	→	↗
B2	→	→	↗	↗

** considering a wide variety of impacts.*

The IPCC SRES scenarios present a mixed picture (see Table 1 and Figure 4). In the imaginary world depicted by the A1 scenarios, globalisation develops rapidly within the materialist-consumerist paradigm. The emphasis is on pursuing economic growth rather than protecting the environment. Economic growth and rapid technological progress lead to better living standards in most parts of the world. Tourism grows very fast. Developing regions are integrated into the global economy, allowing technologies to diffuse rapidly. However, on the negative side, economic and population growth lead to increasing demand for water and many developing regions experience water shortages. CO_2 emissions increase considerably and the contribution from the tourism sector rises sharply. The current trend of significant reductions in biodiversity continues, and although overall human health and social conditions improve, this is mainly based on an increase in income per capita. In this world the further realisation of the economic transition has priority over the strengthening of the social and ecological values, which inevitably impedes the social

and ecological transition. In the short term such a strategy may lead to an improvement of health and wealth but, in the longer run, severe reductions in the quality of our natural resources profoundly impacts the functioning of the world's ecosystems and thus society.

In the 'A2 world', the prospects look dim. Although the IPCC does not attach a value to each of the four scenario families, developments look most unfavourable in the A2 scenario. The A2 world consolidates into several economic regions. There is greater self- reliance in term of resources and less emphasis on interactions between regions. Economic growth is skewed and the current gap between the rich and poor fails to narrow. Some regions move towards greater welfare, while others remain poor. Pressures on key natural resources such as biodiversity and water remain or increase. Tourism hardly develops, without any concern for the environment.

One can see the A2 scenario family as describing a failed transition: a globalising world without global governance leading to a decrease in the world's prosperity and to environmental degradation. Failure of the global economic transition prevents the completion of the social and ecological transitions in many regions. Instead, the downward spiral of low economic growth and environmental degradation - combined with the diminution of social capital in many regions - will lead to a decrease in health and well being. In the A2 scenarios, the transition scarcely gets under way.

In the 'B1 world' we see rapid change and convergence. Economic development is in balance, an effective welfare system prevents social exclusion, and the protection of the global environment is high on the agenda. Tourism develops at a moderate rate, but without significant pressure on the environment. In contrast to the A1 scenario, much more effort is made to tackle global environmental issues such as loss of biodiversity and water scarcity. The health transition to lower fertility and mortality levels is enhanced due to increased investments in social and ecological capital, and not simply left to economic forces (like in the A1 scenarios). Here, economic developments follow the ecological and social transition paths. Of the range of scenarios examined in our global assessment, this imaginary world looks the most promising.

In B2, education and welfare programmes reduce mortality rates in several regions. In this world a favourable climate for community initiative and social innovation prevails, and there is considerable concern for the environment. Thanks to the high education level and the large degree of organisation within communities, the pressure on water and biodiversity is greatly reduced, although the regional differences are enormous. The development of tourism is slow but well planned.

Overall, the prospects for achieving more sustainable patterns of development in the decades ahead appear to be mixed. Trends and projections for a number of key issues give cause for serious concern, in particular with regard to loss of biodiversity and water scarcity. The persistence of current trends in a number of critical areas, many of which have a 'business-as-usual' character according to the IPCC SRES scenarios, will lead to further decline in the quality of life in many developing regions.

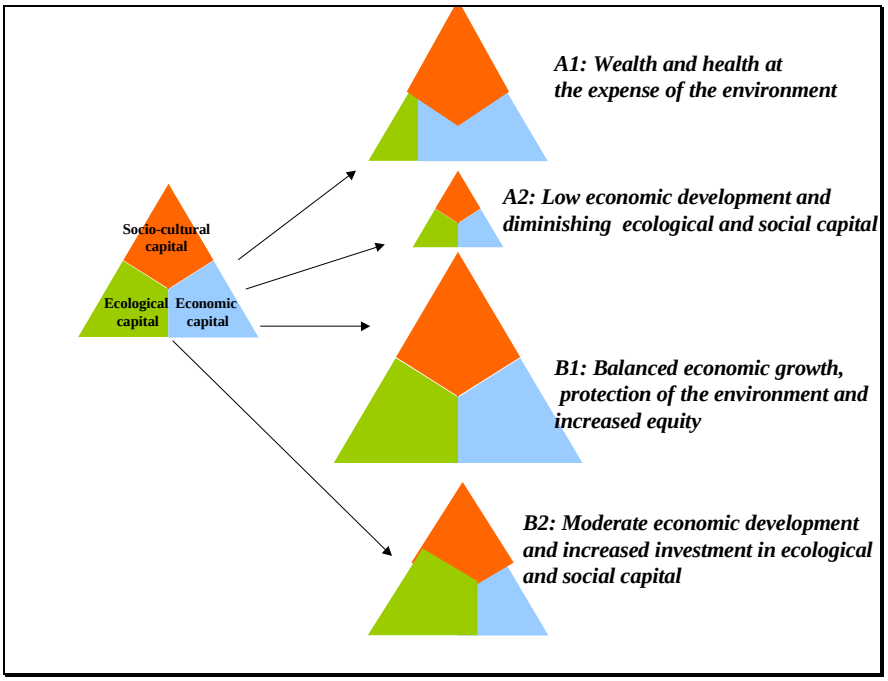

Figure 4: Future developments and the dynamics of capital stocks.

5. Conclusions

Drawing conclusions from this global assessment is difficult, partly because it is partial, but also because of its inherent subjectivity. We have sketched a range of signals, both positive and negative. Despite record rates of global economic growth, disparities in wealth between the developed countries and the developing world have increased. The same trend is recognisable within the developing world: greater disparities between more successful developing countries and those that remain least developed. Many of the latter group have failed to achieve the "take-off" phase of the socio-economic transition, as a result of which they are progressively less able to participate in the current global economic system.

On the other hand, considerable socio-economic progress has been made in many developing countries over recent decades. The social, economic and health transition in many developing countries is occurring much more rapidly than was the case in industrialised countries [11]. Education and health have improved significantly. Fertility rates are declining more rapidly than anticipated in most regions of the world. Tourism is increasing rapidly, providing opportunities and financial resources for many parts of the world. However, if not properly managed, tourism will put additional pressures on ecosystems and may facilitate the spread of diseases.

Environmental quality with respect to air and fresh water has generally improved in the developed world, but is still worsening in many developing areas. Global environmental concerns now include the degradation of renewable resources (mainly soil, forests, habitats, water and the atmosphere). The extent and/or quality of these natural resources, especially in relation to biodiversity, have declined in many parts of the world.

With hindsight, global development can be characterised as both more complicated and more surprising than was anticipated. Many problems identified in earlier "doom scenarios" persist, but have not destroyed the planet. Some threats have receded, such as global cooling, nuclear war and fossil fuel and mineral exhaustion, while others have proved susceptible to effective policy intervention, such as population pressure and industrial pollution. On the other hand, new and unexpected threats have emerged: global climate change, water shortages and the spread of infectious diseases. One clear lesson can be learned from the many global assessments that have been produced over the past decades: dogmatic predictions regarding the earth's future are unreliable, ill-founded and misleading, and can be politically counterproductive.

So, the current outlook is beset with uncertainties, but prudent policy-making must involve some anticipation of events and the future is not entirely a black box. We have improved our understanding of the interactions among social, economic and ecological systems and have a better appreciation of uncertainty and risk management. Scenarios are no longer used to predict, but rather to paint pictures of possible futures and explore possible outcomes if certain basic assumptions are changed, for example those regarding policy interventions.

The increasing complexity of our global society means that sustainable development cannot be addressed from a single perspective, country or scientific discipline. Planning for sustainable development is far more complex than most problems that had to be tackled in the past. Planning for sustainable development requires new paradigms and innovative methods, balancing the short term and long term, the objective and value-laden, the quantitative and qualitative, the certain and uncertain.

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Box 1: The conceptual framework: transitions

The concept of transitions as such is not new: it has its roots in biology and population dynamics. In the field of social development, for example, the transition concept was empirically founded and validated on the demographic transition. What is new, however, is the use of the concept of transitions to describe broad social, ecological and economic changes and to explain their mutual connection [12]. This implies that the concept of transitions is used as a heuristic with which the complexity of global changes can be described and explained.

A transition can be defined as a gradual, continuous process of societal change where the structural character of society (or a complex sub-system of society) transforms (see Figure Box 1). A transition is no fixed pattern, nor a blueprint, is not uniform and not deterministic: there are large differences in the rate and scale of change and the period over which it occurs. A transition process is not set in advance, because during a process of change, humans are able to adapt to, learn from and anticipate new situations. Rather, transitions are possible development paths where the direction, size and speed can be influenced through policy and specific circumstances.

A transition is the result of developments in different domains. In other words, a transition can be described as a set of connected changes, which may reinforce each other but take place in several different areas, such as technology, the economy, institutions, behaviour, culture, ecology and belief systems. Because transitions are multi-dimensional with different dynamic layers, several developments must come together in several domains for a transition to occur.

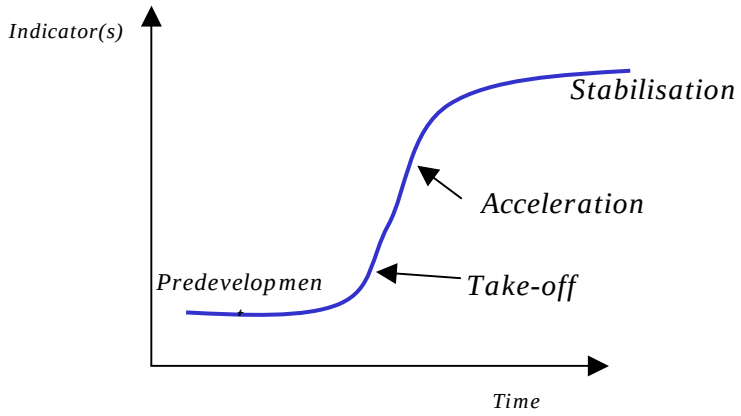

Figure Box 1: The four phases of a transition (Source: [13]).

- *A predevelopment phase of dynamic balance, in which the status quo is subject to no visible change.*
- *A 'take-off' phase, when an initial shift in the system causes the process of change to get under way.*
- *An acceleration phase, in which visible structural changes take place through the interactions between an accumulation of socio-cultural, economic, ecological and institutional changes.*
- *A stabilisation phase in which the speed of the social change decreases and a new dynamic balance is reached.*

Box 2: The IPCC Special Report on Emission Scenarios (SRES) [10].

The first group of scenarios [A1] is characterised by fast economic growth, low population growth and the accelerated introduction of new, cleaner and more effective technologies. Under this scenario, social concerns and the quality of the environment are subsidiary to the principal objective: the development of economic prosperity. Underlying themes combine economic and cultural convergence, and the development of economic capacity with a reduction in the difference between rich and poor, whereby regional differences in per capita income decrease in relative (but not necessarily absolute) terms.

The second group of scenarios [A2] also envisages a future in which economic prosperity is the principal goal, but this prosperity is then expressed in a more heterogeneous world. Underlying themes include the reinforcement of regional identity with an emphasis on family values and local traditions, and strong population growth. Technological changes take place more slowly and in a more fragmented fashion than in the other scenarios. This is a world with greater diversity and more differences across regions.

In the third group [B1], striving for economic prosperity is subordinate to the search for solutions to environmental and social problems (including problems of inequity). While the pursuit of global solutions results in a world characterised by increased globalisation and fast-changing economic structures, this is accompanied by the rapid introduction of clean technology and a shift away from materialism. There is a clear transformation towards a more service and information-based economy.

The fourth group [B2] sketches a world that advances local and regional solutions to social, economic and ecological problems. This is a heterogeneous world in which technological development is slower and more varied, and in which considerable emphasis is placed on initiatives and innovation from local communities. Due to higher than average levels of education and a considerable degree of organisation within communities, the pressure on natural systems is greatly reduced.

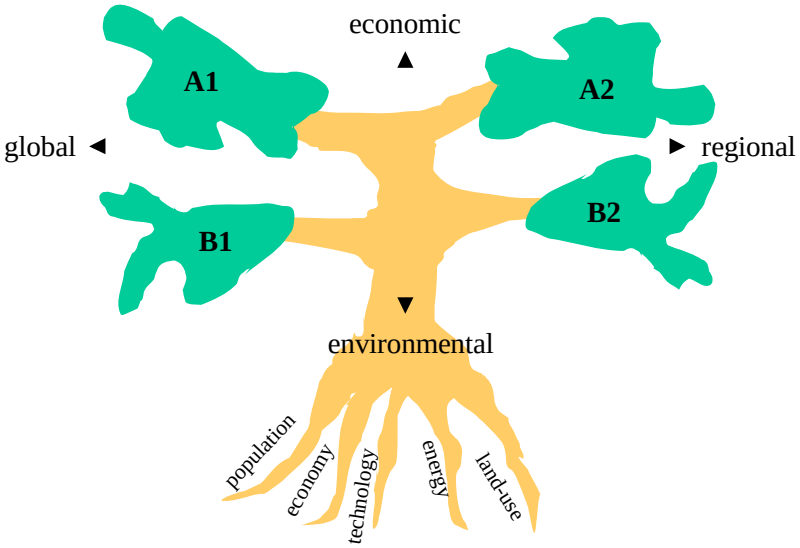

Figure Box 2: The IPCC SRES scenarios as branches of a two-dimensional tree. The dimensions indicate the relative orientation of the different scenarios in relation to economic or environmental concerns, and global and regional development patterns [10].